

NIWeek (LabVIEW Woodstock)
August 14-18, 2000, Austin, Texas



***Real “Real-Time:”
LabVIEW and VxWorks,
or LabVIEW in Space!***

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Why Bother?

- Research project - to answer the question -
Can LabVIEW be used as flight software? Including all the requirements of flight software?
Can software developed on the ground be transitioned to flight without having to re-write it?

Current Default Real-Time Configuration for S/C

- VME Embedded Power PC Board
(flight-qualified)
 - Rad hard, conduction cooled,
 - Temperature and materials tested
- VxWorks real-time OS
- C or C++

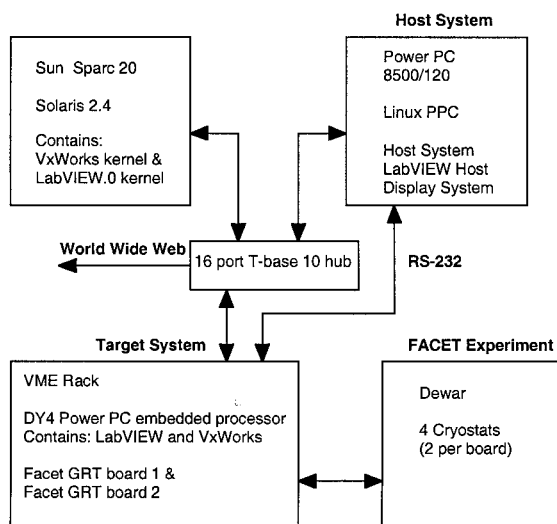
What's Wrong With Current Configuration?

- Too expensive
 - Software written on the ground in Labs by PIs needs to be re-written for flight
 - Not user-friendly
- If you know LabVIEW there's no need to ask

Hardware

- DY4 Power PC Board in a VME Chassis
- Two custom (flight I/O) hardware boards delivered by Ball
- Various support and network equipment
- Delivered for low-temp experiment on Space Station

Schematic



Software

- Special version of LabVIEW developed by NI to run on VxWorks
- Developed drivers with Ball for boards in C
- Debugged delivered software

What Took So Long?

- Good News - Able to integrate flight-critical hardware boards
- Bad News - You can't simply integrate flight-critical hardware boards
 - Issues
 - Power
 - Grounding
 - ESD
 - Availability

Status

- Running experiment scripts
- Simulating data and reading it from boards
- Displaying it on another computer via internet

What Now?

- Develop new scripts - see if they can be developed better, faster and cheaper in LabVIEW
- Begin to address software issues
 - Timing
 - Restart
 - Fault detection

Where would we like to go

- LabVIEW in space
- Technology Experiment
e.g., Remote Agent Experiment

How can NI Help?

- Re-write LabVIEW timing to equal VxWorks
- Reduce 'footprint' or memory size required
- Optimize where needed